

AMENDMENTS TO THE CLAIMS

The claims in this listing replaces all prior versions and listings of claims in the application.

Listing of Claims:

1-13. (Canceled)

14. (Currently Amended). A data storage medium readable by a computer for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data storage medium comprising:

as a part of the volume/file structure, a partition descriptor containing address information for an unallocated space information control block (ICB) [[ICB]] for managing unallocated space in a volume space, and

a logical volume descriptor containing address information for a root directory ICB for managing a directory structure under the root directory [[:]] , said unallocated space ICB containing address information for a following unallocated space ICB and address information for unallocated space;

said root directory ICB containing address information for a following root directory ICB and address information for a root directory file; and

said unallocated space ICB and root directory ICB being recorded to a chaining information area as chaining information that is part of a progressively updated and recorded file structure in order to manage a file of the data storage medium read by the computer.

15. (Currently Amended) A data storage medium readable by a computer to record and reproduce files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, the data storage medium comprising:

an open integrity information area for recording at least one logical volume integrity descriptor containing address information for close integrity information, said close integrity information indicating a close status assuring the integrity of the volume/file structure recorded in the volume space; and

a close integrity information area for recording at least one logical volume integrity descriptor containing address information for open integrity information, said open integrity information indicating an open status indicative of a start of a volume/file structure recording operation,

wherein an overrun extent is recorded in a volume space, said overrun extent having an unrecorded open integrity information area and close integrity information area allocated for respectively update-recording open integrity information and close integrity information, the computer managing a file by reading the data storage medium.

16. (Canceled)

17. (Currently Amended) A data recording method for recording data to a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data recording method comprising:

recording as a part of the volume/file structure a partition descriptor containing address information for an unallocated space [[ICB]] information control block (ICB) for managing unallocated space in a volume space, and

recording a logical volume descriptor containing address information for root directory ICB for managing a directory structure under the root directory;

said unallocated space ICB containing address information for a following unallocated space ICB and address information for unallocated space;

said root directory ICB containing address information for a following root directory ICB and address information for a root directory file; and

said unallocated space ICB and root directory ICB being recorded to a chaining information area as chaining information that is part of a progressively updated and recorded file structure.

18. (Previously Presented) A data recording method for recording data to a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data recording method comprising:

recording a logical volume integrity descriptor to an open integrity information area, said logical volume integrity descriptor containing address information for close integrity information, said close integrity information indicating a close status assuring the integrity of the volume/file structure recorded in the volume space; and

recording a logical volume integrity descriptor to a close integrity information area, said logical volume integrity descriptor containing address information for open

integrity information, said open integrity information indicating an open status indicative of a start of a volume/file structure recording operation,

wherein an overrun extent is recorded in a volume space, said overrun extent having an unrecorded open integrity information area and close integrity information area allocated for respectively update-recording open integrity information and close integrity information.

19. (Canceled)

20. (Currently Amended). A data recording apparatus for recording data to a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data recording apparatus comprising:

means for recording as a part of the volume/file structure a partition descriptor containing address information for an unallocated space [[ICB]] information control block (ICB) for managing unallocated space in a volume space, and

means for recording a logical volume descriptor containing address information for a root directory ICB for managing a directory structure under the root directory;

said unallocated space ICB containing address information for a following unallocated space ICB and address information for unallocated space;

said root directory ICB containing address information for a following root directory ICB and address information for a root directory file; and

said unallocated space ICB and root directory ICB being recorded to a chaining information area as chaining information that is part of a progressively updated and recorded file structure.

21. (Previously Presented). A data recording apparatus for recording data to a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data recording apparatus comprising:

means for recording a logical volume integrity descriptor to an open integrity information area, said logical volume integrity descriptor containing address information for close integrity information, said close integrity information indicating a close status assuring the integrity of the volume/file structure recorded in the volume space; and

means for recording a logical volume integrity descriptor to a close integrity information area, said logical volume integrity descriptor containing address information for open integrity information, said open integrity information indicating an open status indicative of a start of a volume/file structure recording operation,

wherein an overrun extent is recorded in a volume space, said overrun extent having an unrecorded open integrity information area and close integrity information area allocated for respectively update-recording open integrity information and close integrity information.

22. (Canceled)

23. (Currently Amended). A data reproducing method for reproducing data from a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data reproducing method comprising:

reproducing as a part of the volume/file structure a partition descriptor containing address information for an unallocated space [[ICB]] information control block (ICB) for managing unallocated space in a volume space, and

reproducing a logical volume descriptor containing address information for a root directory ICB for managing a directory structure under the root directory;

said unallocated space ICB containing address information for a following unallocated space ICB and address information for unallocated space;

said root directory ICB containing address information for a following root directory ICB and address information for a root directory file; and

said unallocated space ICB and root directory ICB being reproduced from a chaining information area as chaining information that is part of a progressively updated and recorded file structure.

24. (Previously Presented). A data reproducing method for reproducing data from a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data reproducing method comprising:

reproducing a logical volume integrity descriptor from an open integrity information area, said logical volume integrity descriptor containing address information

for close integrity information, said close integrity information indicating a close status assuring the integrity of the volume/file structure recorded in the volume space; and

reproducing a logical volume integrity descriptor from a close integrity information area, said logical volume integrity descriptor containing address information for open integrity information, said open integrity information indicating an open status indicative of a start of a volume/file structure recording operation,

reproducing an unrecorded open integrity information area and close integrity information area allocated for respectively update-recording open integrity information and close integrity information in an overrun extent recorded in a volume space.

25. (Canceled)

26. (Currently Amended). A data reproducing apparatus for reproducing data from a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data reproducing apparatus comprising:

means for reproducing as a part of the volume/file structure a partition descriptor containing address information for an unallocated space [[ICB]] information control block (ICB) for managing unallocated space in a volume space, and

means for reproducing a logical volume descriptor containing address information for a root directory ICB for managing a directory structure under the root directory;

said unallocated space ICB containing address information for a following unallocated space ICB and address information for unallocated space;

said root directory ICB containing address information for a following root directory ICB and address information for a root directory file; and

said unallocated space ICB and root directory ICB being reproduced from a chaining information area as chaining information that is part of a progressively updated and recorded file structure.

27. (Previously Amended). A data reproducing apparatus for reproducing data from a data storage medium for recording and reproducing files managed using a volume/file structure, the number of data recording operations to any same area of the data storage medium being limited, said data reproducing apparatus comprising:

means for reproducing a logical volume integrity descriptor from an open integrity information area, said logical volume integrity descriptor containing address information for close integrity information, said close integrity information indicating a close status assuring the integrity of the volume/file structure recorded in the volume space; and

means for reproducing a logical volume integrity descriptor from a close integrity information area, said logical volume integrity descriptor containing address information for open integrity information, said open integrity information indicating an open status indicative of a start of a volume/file structure recording operation,

means for reproducing an unrecorded open integrity information area and close integrity information area allocated for respectively update-recording open integrity

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information and close integrity information in an overrun extent recorded in a volume space.

28. (Canceled)